GE Energy

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MFN 05-095

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Part 21 Notification Completion: Critical Power Determination for GE14 and GE12 Fuel With Zircaloy Spacers**

Reference: Part 21 60-Day Interim Report Notification: Critical Power Determination for GE14 and GE12 Fuel With Zircaloy Spacers, MFN 05-058 Rev 1, June 24, 2005

The reference letter provided a 60-day interim report notification on critical power determination for GE14 and GE12 fuel with Zircaloy spacers. The letter reported preliminary analysis on the impact of potential non-conservative critical power determination for fuel bundle corner pin locations for the identified fuel designs. The purpose of this letter is to report that the preliminary analyses have been completed and the results provided in the reference letter have been confirmed.

Summary

During review of GE14 ATLAS critical power tests results, it was discovered that springs on the Zircaloy test spacers used in the GE14 and GE12 critical power testing were deformed, possibly during the testing. This resulted in a potentially non-conservative critical power determination for fuel bundle corner pin locations on GE14 and GE12 bundles with Zircaloy spacers. GE12 fuel with Inconel spacers is not affected. This non-conservatism potentially impacts the calculated margin to the Operating Limit Minimum Critical Power Ratio (OLMCPR) implemented in core evaluations as the maximum fraction of limiting critical power ratio (MFLCPR), the Safety Limit MCPR (SLMCPR), the Rod Withdrawal Error (RWE) analysis, and the R-factors used in the on-line 3D core simulator.

GE has determined that the test spacer deformation can be accounted for in the core evaluation process by revising the GE14 and GE12 Zircaloy spacer R-factor additive constants for the bundle corner fuel pin(s). Use of the revised additive constants resulted in an update to bundle R-factors for plants with GE14 and GE12 fresh fuel

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designs with Zircaloy spacers and also required a change to the GEXL14 analytical solution to assure solution convergence for resultant higher controlled bundle R-factors.

Since issuance of the reference letter, GE has completed the following actions:

1. Completed the current cycle analyses to confirm the non-conservative MFLCPR impact as previously reported to the affected plants. Therefore, administrative adjustments to the limiting MFLCPR previously implemented for affected plants are confirmed to be correct.

2. Completed the analyses to confirm that no plant has a SLMCPR impact greater than or equal to the reportable threshold of 0.01.

3. Completed the evaluation to confirm that the RWE analyses do not impact the OLMCPR.

The completed analyses all confirmed the preliminary analyses reported in the reference letter. The conclusion for each plant is provided in Attachment 1.

Safety Basis

For the impacted plants, this condition, if uncorrected, has the potential to result in exceeding a Technical Specification Safety Limit (TSSL) if a limiting Anticipated Operational Occurrence (AOO) were to occur and one of the following two conditions were to exist: (1) non-conservative margin to the OLMCPR or a non-conservative on-line 3D core simulator calculation resulted in a plant inadvertently exceeding their OLMCPR, or (2) the plant had a non-conservative SLMCPR. The condition could not lead to a substantial safety hazard due to the large margin to fuel failure associated with the OLMCPR and SLMCPR.

Corrective/Preventive Actions

The compensatory actions documented in the reference letter are sufficient to provide adequate TSSL protection and no additional compensatory actions are required as a result of completion of this evaluation. Other actions identified in the reference letter are related to transmittal of specific technical information to affected licensees. Therefore, this completes the NRC notification by GE on this concern.

If you have any questions on this information, please call me at (910) 675-6608.

Sincerely,

Jason Post

Jason. S. Post, Manager
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Attachment 1 – Previously Notified Plants

No Imp = No GE fuel provided is impacted by this issue
Blank = Not using GE fuel

(a) Impact on MFLCPR:
- OK = Analysis complete and MFLCPR not impacted,
- TI = Previously notified as a Transfer of Information; analysis indicates MFLCPR impact, GE does not have sufficient information to determine if the OLMCPR could have been exceeded

(b) Impact on SLMCPR:
- OK = Analysis complete and SLMCPR not impacted (i.e., SLMCPR impact less than reportable threshold of 0.01),
- TI = Previously notified as a Transfer of Information; GE does not have sufficient information to determine if there is an impact on the SLMCPR ≥ 0.01

(c) Impact of Rod Withdrawal Error (RWE) on OLMCPR:
- OK = Analysis complete and RWE analysis not impacted
- TI = Previously notified as a Transfer of Information; GE does not have sufficient information to determine if there is an impact on the RWE analysis

(a)	(b)	(c)	Utility	Plant
TI	OK	OK	AmerGen Energy Co.	Clinton
No Imp	No Imp	No Imp	AmerGen Energy Co.	Oyster Creek
TI	OK	OK	Carolina Power & Light Co.	Brunswick 1
TI	OK	OK	Carolina Power & Light Co.	Brunswick 2
No Imp	No Imp	No Imp	Constellation Nuclear	Nine Mile Point 1
TI	OK	OK	Constellation Nuclear.	Nine Mile Point 2
TI	OK	OK	Detroit Edison Co.	Fermi 2
			Dominion Generation	Millstone 1[1]
			Energy Northwest	Columbia
TI	OK	OK	Entergy Nuclear Northeast	FitzPatrick
OK	OK	OK	Entergy Nuclear Northeast	Pilgrim
			Entergy Operations, Inc.	Grand Gulf
			Entergy Operations, Inc.	River Bend
OK	OK	OK	Entergy Nuclear Northeast	Vermont Yankee
TI	OK	OK	Exelon Generation Co.	Dresden 2
OK	OK	OK	Exelon Generation Co.	Dresden 3
TI	OK	OK	Exelon Generation Co.	LaSalle 1
TI	OK	OK	Exelon Generation Co.	LaSalle 2
TI	OK	OK	Exelon Generation Co.	Limerick 1
TI	OK	OK	Exelon Generation Co.	Limerick 2
TI	OK	OK	Exelon Generation Co.	Peach Bottom 2
TI	OK	OK	Exelon Generation Co.	Peach Bottom 3
OK	OK	OK	Exelon Generation Co.	Quad Cities 1
TI	OK	OK	Exelon Generation Co.	Quad Cities 2
TI	OK	OK	FirstEnergy Nuclear Operating Co.	Perry 1
TI	OK	OK	Nebraska Public Power District	Cooper
TI	OK	OK	Nuclear Management Co.	Duane Arnold
TI	OK	OK	Nuclear Management Co.	Monticello
			PPL Susquehanna LLC.	Susquehanna 1

			PPL Susquehanna LLC	Susquehanna 2
TI	OK	OK	PSEG Nuclear	Hope Creek
OK	OK	OK	Southern Nuclear Operating Co.	Hatch 1
OK	OK	OK	Southern Nuclear Operating Co.	Hatch 2
No Imp	No Imp	No Imp	Tennessee Valley Authority	Browns Ferry 1[1]
TI[2]	TI	TI	Tennessee Valley Authority	Browns Ferry 2
TI[2]	TI	TI	Tennessee Valley Authority	Browns Ferry 3

Notes:

1. Plant is in extended shutdown.
2. Previously identified as "OK," now corrected to TI since GE does not perform MFLCPR analysis for the identified plant.